would imply a difference in origin or a difference in the essential nature of its being. There is a great and a marked difference in kind between the material processes which we call physiological, and the mental processes we call psychical. They belong to wholly different orders of being. I see no reason for believing that mental processes in man differ thus in kind from mental processes in animals. But I do think that we have, in the introduction of the analytic faculty, so definite and marked a new departure that we should emphasize it by saying that the faculty of perception, in its various specific grades, differs generically from the faculty of conception. And believing, as I do, that conception is beyond the power of my favourite and clever dog, I am forced to believe that his mind differs generically from my own."

This seems a very fair statement of the case, and one to which, so far as it goes, I have no objection to make. But in the concluding chapter, on mental evolution, we have a serious attempt to overcome the difficulty of the relation between the physiological and psychical processes here stated to belong to "two wholly different orders of being." This is supposed to be done by the adoption of the *monistic hypothesis*, which assumes that these "wholly different orders" of things are really identical—that *neurosis is psychosis*. "The neurosis is the outer or objective aspect, the psychosis is the inner or subjective aspect." Then the subject is attempted to be made clearer by the adoption of other terms—"kinesis" for physical manifestations of energy, "metakinesis" for all manifestations of the mental or conscious order; and we have the following statement:—

> "According to the monistic hypothesis, *every mode of kinesis has its concomitant mode of metakinesis, and when the kinetic manifestations assume the form of the molecular processes in the human brain, the metakinetic manifestations assume the form of human consciousness.*"

If this means anything, it means, what has been stated in simpler but equally exact and more intelligible language, that all force is will-power. But it goes further, and implies that there can be no mind like that of man, or superior to it, without a brain formed of similar materials and similarly organized with the brain of man. This necessary connection, and even identity, of the two is, however, what is not proved, and not even, in my opinion, shown to be probable.

The last few pages of the volume are devoted to a discussion of the causes which have led to the development of the higher intellectual faculties in civilized man, and a difficulty is found in explaining this development, except on the ground that the increase of intellectuality acquired by use of the intellectual faculties is inherited. The objection may be made that there is no proof of any increase of average intellect in Europe during the last two or the last twenty centuries; and, on the other hand, it seems probable that, although the unintellectual may generate more rapidly, a smaller proportion of the offspring survive. It is suggested that the development of the social habit, the mutual aid and protection thus afforded, may well have left a balance of the life-energy previously employed for individual self-preservation, available for the increase of pure intellect. The exceedingly sporadic character of exceptional intellectual power favours this view, which is analogous to that which I have suggested as having led to the development of the accessory plumes of male birds. Whether the very existence of such faculties can be adequately explained by increased brain-development alone, is another matter.

The present notice, necessarily confined to a few of the more salient features of the book, gives no fair idea of the great variety of topics treated, nor of the originality and clearness which are its great characteristics. The numerous woodcuts and diagrams are all illustrative of the text, and are fully explained, and the author is particularly happy in his use of diagrams and formulæ to illustrate the more obscure or difficult conceptions. The diagram, at p. 141, to explain Weismann's theory, as illustrated by the question, "Does the egg produce the hen, or does the hen produce the egg?" is one of these, and will render the problem intelligible to many who would otherwise have a difficulty in understanding it. On the whole, the work will prove a boon to all who desire to obtain a general knowledge of the more interesting problems of modern biology and psychology by the perusal of a single compact, luminous, and very readable volume.

ALFRED R. WALLACE.

THE LAKE-DWELLINGS OF EUROPE.

The Lake-Dwellings of Europe; being the Rhind Lectures in Archæology for 1888. By Robert Munro, M.A., M.D. (London: Cassell and Co., 1890.)

IN this work on the lake-dwellings of Europe, Dr. Munro has carried out on a wider field the inquiry begun in 1882 in his book on those of Scotland. He has brought to his task qualities of a high order. He had a large share in the exploration of the lake-dwellings in his own country, and has recorded the results in a business-like fashion. He has prepared himself for dealing with the lake-dwellers of the Continent by a painstaking examination of the evidence on the spot, and by visiting all the principal collections. He further has read the voluminous literature bearing on the subject scattered through various journals and periodicals, as well as that which lies ready to hand in separate books. The result of all this labour—and how great it has been only those can know who, like the writer, have gone over the ground—is this work "smelling of the oil" in every page, well illustrated with numerous cuts and with good indexes, and a systematic list of references. It is, indeed, to be looked upon as an encyclopædia of matters relating to lake-dwellings, rather than as an ordinary book. It is little less than a miracle that the vast array of facts brought together should have been compressed into the narrow limits of six lectures.

The lake-dwellings of Switzerland and of the surrounding parts of the Continent were laid before the archæological public in 1866 by Dr. Keller and his English translator and editor, the late Mr. Lee, to whom, some twelve years later, we owe a second and enlarged edition. Since that time discovery has rapidly followed discovery in various parts of Europe. These have been carefully recorded by Dr. Munro in the work before us. The first three hundred pages, comprising the first three lectures and part of the fourth, deal with the lake-dwellings in Switzerland, France, and Italy. The rest of the fourth lecture is devoted to the discoveries in North Germany made principally by Prof. Virchow, and to the curious mounds which stud the marshes of Holland, and which occur also in those at the mouth of the Elbe.

The *terpen*, as they are called, of Holland, deserve more than a passing notice. They rise to a point above high-water mark, and break the monotony of the dead level which, before the construction of the sea-dykes in the twelfth century, must have been covered by every tide. Then they must have been islands, now they are mounds of various sizes, and distributed at sufficiently convenient intervals to afford sites for modern churches and villages, and even towns such as Leeuwarden and Leyden. A few years ago it was discovered that they were largely composed of domestic refuse, so rich in animal matter as to be of great value for manuring the land. The excavations for that purpose have shown that they are artificial islands formed of clay and of timbers, both upright and horizontal, which have been inhabited long enough to allow of great accumulations of refuse. Among the fragments of pottery found in them may be noted the Samian ware; and among the articles made of bone, combs identical with those found in association with Roman remains in lake-dwellings in Scotland. There are also glass beads, bronze dishes and tripods, and Roman statuettes and fibulæ, together with iron bridle-bits, shears, and hammers. The associated coins of the Roman emperors —Byzantine, Anglo-Saxon, and Frankish—fix the date of their occupation. They were inhabited from the time of the Roman attack on the Rhine as late at least as the reign of Lothair (A.D. 840–855), whose empire extended from Italy northwards as far as the Meuse and the Rhine. It is a significant fact that the evidence of the occupation of these mounds ceases with the break-up of the empire of Charles the Great, and the struggles between his degenerate descendants. They probably lay desolate towards the end of the ninth century, and became so completely forgotten that their story has only been made out by the recent diggings.

These mounds, however, apart from the light which they throw on the darkness of the written records of the first eight centuries after Christ, have a further claim to our interest in the fact that they were well known to the students of history in Rome as early as the first century after Christ. They are described by Pliny the Elder, in a passage worthy of being quoted:—

> "We saw," he writes, "in the north the Chauci, who are called the Greater and the Less. In their country there is a great tract over which the ocean rolls in great volume twice each day, and raises for us the never-ending discussion as to whether it should be called land or sea. Here a miserable tribe lives on lofty mounds or artificial eminences raised to a height which they know by experience to be above the highest tide. These they occupy with their cabins. When the tide is up, they look like sailors in ships with water on every side; when it is down, like mariners who have been stranded. Their food is fish, caught around their cabins in the ebbing waters. They have no cattle, and do not use milk as their neighbours do, nor does it fall to their lot to contend with wild beasts, since there are no shrubs for cover. They twist cords of sedges and marsh rushes, and make them into fishing-nets. They dig turves, too, and, after drying them more by the wind than the heat of the sun, cook their food with them, and so warm their stomachs, frozen by the northern blasts. Rain-water is their sole drink, stored in ponds at the entrance of their houses. Even these tribes, were they conquered to-day by the Roman people, would say that they were slaves" (Pliny, "Nat. Hist., xvi. 1).

At a later time they possessed oxen and sheep and horses, and from the occurrence of Roman coins and of Samian ware—the Sèvres of the period—it may be concluded that they were in touch with the Roman civilization. They may have served in the Roman army, and they most probably shared in the attacks repeatedly made by the Germanic tribes on the Roman Empire. It would, indeed, be strange if none of the spoils of the legions of Varus, and if no traces of the conquest of their country by Germanicus, followed by his disastrous retreat, were met with in these ancient dwellings in the marshes of Holland.

The fifth chapter is devoted to the lake-dwellings of Britain and Ireland. The Irish crannogs date as far back as the Bronze Age, if not as far back as the Neolithic, and were inhabited as late as the time of Charles II., while those of Scotland begin with the Iron Age, and range as far down as the seventh and eighth centuries after Christ. Those on the south-west—such, for example, as Loch Lee, near Dumbarton—contain the same mixture of fragments of Samian ware and other articles of Roman civilization, with barbaric implements implying a rude manner of life, as we find in the *terpen* of Holland. The region between the Roman Wall and the Highlands was the scene of continual fighting between the Picts and Scots on the one hand and the Roman legions on the other, from the days of Agricola down to the time of the retreat of the Romans from Britain, and afterwards between the Celtic tribes and the English. With the conquest of the kingdom of Strathclyde by the Northumbrian Angles their history ceases.

Dr. Munro ascribes all the lake-dwellings in the British Isles to a Celtic source, and he believes that the Celts of Britain got the idea of protecting themselves by making artificial islands in lakes or morasses from "contact with the inhabitants of the pile villages in Central Europe." These conclusions seem to me not to be proved. It may be allowed that most, if not all, of our British lake-dwellings were built and inhabited by Celtic peoples, but it does not follow that they got the art of building them from Switzerland. Lake-dwellings would be naturally invented by any race living in a state of warfare in a land of lakes and morasses. In other regions the Celts constructed for the same purposes fortified camps where there were no lakes and morasses. The lake-dwellings, therefore, are most probably a mere local development depending on the geographical conditions. Seeing that pile-dwellings are now used by widely different races, ranging over an area from Central Africa to New Guinea, it is improbable that they should have been built by one race only in prehistoric times. In Switzerland itself they were used by the various invaders from the Stone Age down to the time when their Gallic inhabitants were conquered by the Romans.

Dr. Munro sums up with great care in his concluding chapter the principal features of the civilization of the European lake-dwellers. He accepts the Age of Stone, and rejects that of copper, pointing out that copper implements are probably the result of the local scarcity of the tin necessary for the manufacture of bronze. In treating of the Bronze Age, he considers the crescent-shaped earthenware articles rising from a flat base, found in several of the villages, to be "suggestive of religious ideas" instead of being head rests. The latter and more popular view seems to me to be most probable. Again, our author says that "the lake-dwellings of the Bronze Age are built in deeper water, and consequently further from the shore, than those of the Stone Age" (p. 538). Surely they were built further from the shore for purposes of defence against the better weapons, and consequently in deeper water. These, however, are minor points of criticism in a work which will be of great service to archæologists. Dr. Munro is to be congratulated on his success in completing a most difficult task.

W. BOYD DAWKINS.

OUR BOOK SHELF.

Colour in Woven Design. By Roberts Beaumont, Professor and Director of the Textile Department in the Yorkshire College. Pp. xxiv. and 440. (London: Whittaker and Co., 1890.)

AMONGST the merits which this book may possess (and we do not deny that they are considerable), elegance and accuracy of diction cannot be reckoned. This criticism is justified by the occurrence of countless phrases, such as these—"Non-luminous bodies are incompetent of emitting undulations that convey any coloured appearance to the mind"; "linear and curvilinear lines"; and "in the rose there is displayed in perfection all the various modifications in tint and shade to which this important colour (red) is susceptive." And we cannot endorse in all particulars the exposition of the theories of colour given by Prof. Beaumont. For instance, he contrasts what he calls the "light theory of colours" with the "pigment theory," and then, speaking of the latter, says: "Scientifically, it is no more a correct scheme than the light theory is applicable to the indústries or to the mixing of paints." But surely the theory of Young, Maxwell, and Helmholtz is as applicable to the results obtained by mixing pigments or coloured fibres, as it is to the results of mingling coloured lights. Yet, while the author writes, on p. 20, "many of the mixtures obtained by this system (that adopted by Chevreul and Brewster) are diametrically opposed to the laws of physics," he proceeds to explain the chromatic phenomena of textiles by its aid. It is needless to urge how deeply Prof. Beaumont's acceptance of the red-yellow-blue triad of primaries vitiates his reasoning as to the effects of contrast, as to the question of the existence of tertiary hues, and as to the true complementaries.

When, however, we turn to the practical or technical sections of this hand-book, we find much information of sterling value. Here Prof. Beaumont is evidently at home. The numerous diagrams and photographs of checks, stripes, weaves, yarns, twists, twills, and diagonals, illustrate the descriptions in the text most satisfactorily. The analysis and synthesis of the various "weaves" are particularly well carried out, and constitute the largest and most important part of the volume before us. A scientific journal is, however, not the place for the discussion of such details of manufacture.

A few of the coloured plates are satisfactory; in others the garish hues and harsh associations may, we hope, be attributed to the failure of the chromolithographs to realize the intentions of the author. But some of the coloured figures are deplorably poor, or even thoroughly debased, in design; note particularly Plate xviii.; Plate xxviii., Fig. 2; and Plate xxxi., Fig. 2. A. H. C.

Constance Naden: a Memoir. By William R. Hughes. (London: Bickers and Son. Birmingham: Cornish Brothers. 1890.)

MISS NADEN was a writer of considerable freshness and ability, and all who knew her agree that she was also a woman of great charm of character. She did not, however, live long enough to produce anything of first-rate importance, and it was hardly advisable to make her the subject of a special memoir. Mr. Hughes appreciates thoroughly all that was most characteristic of his friend's intellectual and moral nature, but he does not possess the secret of presenting brightly and vividly facts in which he himself happens to be interested. Consequently, he does not succeed in conveying any adequate conception even of qualities which he is never tired of praising. The volume contains, besides Mr. Hughes's sketch, an introduction by Prof. Lapworth, and "additions" by Prof. Tilden and Dr. Lewins. The latter gentleman, who delights in the use of an extraordinary philosophical jargon, thinks it would be impossible to be satisfied with any memoir of Miss Naden "which should ignore the scientific hylo-ideal, or automorphic principle, or synthesis underlying and suffusing her whole intellectual and ethical architectonic." He proceeds to supply the necessary exposition, his chief difficulty being "the elementary *naiveté* and simplicity of the concept, or ideal, involved."

Euclid's Elements of Geometry. Arranged by A. G. Layng. (London: Blackie and Son, Ltd., 1890.)

IN this work, Euclid's Books I.-IV., VI., and portions of V. and XI., are dealt with. The enunciations and axioms are the same as those in Simson's edition, but the propositions have received many minor alterations. Only the more common symbols are employed, and some of the propositions have been considerably shortened by the adoption of other proofs based on Euclid's methods. Each proposition is accompanied with examples and in many cases with notes.

An excellent plan adopted throughout is that by which the student can see at a glance the enunciations, propositions, and figures, without the necessity of turning over a page. The appendix contains some simple theorems of modern geometry, a few alternative proofs of the propositions based on other methods than those of Euclid, and a collection of miscellaneous examples and examination papers. Beginners will find the book rather troublesome at first, owing to the use of the symbols; but after these are understood little difficulty ought to be experienced.

LETTERS TO THE EDITOR.

[*The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts intended for this or any other part of* NATURE. *No notice is taken of anonymous communications.*]

Hermaphroditism of the Apodidæ.

THE reproduction of *Apus cancriformis* has been a much discussed subject. Although the animal has been well known since the middle of last century, it was not till 1833 that a male was reported to have been found, and not till 1856 that the occasional presence of males in small numbers was certainly established by Kozubowski. On the other hand, the fact that several generations of "females" could be produced without the presence of a male, was established as long ago as 1755 by Schaeffer, who concluded that the animals were hermaphrodite. Since that time authors have been divided in opinion between hermaphroditism and parthenogenesis (not to mention v. Siebold's theory of Thelytoky); the latter view has lately prevailed.[1]

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[1] For the history of this subject see Bronn's "Classen und Ordnungen des Thierreichs," vol. v. On p. 810 the following words occur;—"Untersuchungen über die Gattungen Apus und Daphnia welche offenbar in dem bis zu voller Evidenz geführten Nachweis der Parthenogenetischen Fortpflanzung beider gipfeln." See also Lang's "Lehrbuch der Vergleichende Anatomie," p. 393.